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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,744	02/27/2004	Wai Yuen Ho	200207272-1	8419

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INTELLECTUAL PROPERTY ADMINISTRATION  
FORT COLLINS, CO 80527-2400

EXAMINER
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LIANG, LEONARD S

ART UNIT	PAPER NUMBER
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2853

NOTIFICATION DATE	DELIVERY MODE
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02/09/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/789,744	<b>Applicant(s)</b> HO, WAI YUEN	
	<b>Examiner</b> LEONARD S. LIANG	<b>Art Unit</b> 2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 October 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,4-7 and 10-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 4-7, 10-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4-7, and 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al (US Pat 5097189) in view of Kushino et al (JP Pat 2000104799 A) and Black et al (US Pat 3780652).

Ito et al discloses:

- {claim 1} A carriage drive system (figure 1); a variable speed drive motor configured to propel a movable carriage along a slide rod, wherein the movable carriage supports print heads having an ink ejecting nozzle (figure 1, references 2, 3A, 3B, and 6; abstract; column 4, lines 44-54)
- {claim 7} A printer (figure 1); a movable carriage supporting print heads having an ink ejecting nozzle (figure 1, reference 2); a slide rod for supporting and guiding the movable carriage (figure 1, reference 3A, 3B); a variable speed drive motor configured to propel the movable carriage along the slide rod (figure 1, reference 6), wherein the variable speed drive motor is an electric motor (column 4, lines 49-50)
- {claim 14} A method of printing (figure 1); comprising activating a variable speed drive motor to propel a movable carriage along a slide rod, wherein

the movable carriage supports print heads having an ink ejecting nozzle  
(figure 1; abstract; column 4, lines 44-54)

Ito et al differs from the claimed invention in that it does not disclose:

- {claim 1} a gearing mechanism, wherein the gearing mechanism has a first gear ratio resulting in a high carriage speed and a second gear ratio resulting in a low carriage speed and comprises a planetary gear assembly having: a sun gear driven by the drive motor; a ring gear; and a plurality of planet gears arranged between the sun gear and the ring gear, wherein, at the second gear ratio, the sun gear rotates and the ring gear is configured to rotate at a slower angular velocity than the sun gear; and a centrifugal clutch operable to enable the gearing mechanism to switch between the first and second gear ratios automatically based upon an operational speed of the drive motor
- {claims 4 and 10} wherein operation of the drive motor at a high speed causes the centrifugal clutch to engage the ring gear causing the planet gears and the drive gear to be locked together such that they rotate as one with the sun gear resulting in a 1:1 gear ratio between the sun gear and the ring gear and operation of the drive motor at a low speed causes the centrifugal clutch to disengage the ring gear
- {claims 5 and 11} further comprising a speed calibration member for adjusting the gear ratio between the drive motor and the ring gear

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- {claims 6 and 12} wherein the gear ratio between the drive motor and the ring gear is proportional to a friction force between the planet carrier and the speed calibration member
- {claim 7} a gearing mechanism having a first gear ratio resulting in a high carriage speed and a second gear ratio resulting in a low carriage speed, wherein the gearing mechanism comprises a planetary gear assembly having a sun gear driven by the drive motor; a ring gear; and a plurality of planet gears arranged between the sun gear and the ring gear, wherein, at the second gear ratio, the sun gear rotates and the ring gear is configured to rotate at a slower angular velocity than the sun gear; and a centrifugal clutch operable to switch between the first and second gear ratios wherein the centrifugal clutch is an automatic two-way clutch, such that switching between the first and second gear ratios occurs automatically based upon an operational speed of the drive motor
- {claim 13} wherein the speed calibration member is manually adjustable
- {claim 14} activating a gearing mechanism wherein the gearing mechanism has a first gear ratio resulting in a high carriage speed and a second gear ratio resulting in a low carriage speed and comprising a planetary gear assembly having: a sun gear driven by the drive motor; a ring gear; and a plurality of planet gears arranged between the sun gear and the ring gear; wherein, at the second gear ratio, the sun gear rotates and the ring gear is configured to rotate at a slower angular velocity than

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the sun gear; and switching between the first and second gear ratio;

wherein switching between the first and second gear ratio occurs

automatically based on an operational speed of the drive motor

- {claim 15} wherein operation of the drive motor at a high speed causes the planet gears and the drive gear to lock together such that they rotate as one with the sun gear resulting in a 1:1 gear ratio between the sun gear and the ring gear

Kushino et al discloses:

- {claim 1} a gearing mechanism, wherein the gearing mechanism has a first gear ratio resulting in a high carriage speed and a second gear ratio resulting in a low carriage speed and comprises a planetary gear assembly having: a sun gear driven by the drive motor; a ring gear; and a plurality of planet gears arranged between the sun gear and the ring gear, wherein, at the second gear ratio, the sun gear rotates and the ring gear is configured to rotate at a slower angular velocity than the sun gear; and a centrifugal clutch operable to enable the gearing mechanism to switch between the first and second gear ratios automatically based upon an operational speed of the drive motor (abstract; paragraph 0010-0011, 0015-0016)
- {claims 4 and 10} wherein operation of the drive motor at a high speed causes the centrifugal clutch to engage the ring gear causing the planet gears and the drive gear to be locked together such that they rotate as

one with the sun gear resulting in a 1:1 gear ratio between the sun gear and the ring gear and operation of the drive motor at a low speed causes the centrifugal clutch to disengage the ring gear (abstract; paragraph 0010-0011, 0015-0016)

- {claims 5 and 11} further comprising a speed calibration member for adjusting the gear ratio between the drive motor and the ring gear (abstract; paragraph 0010-0011, 0015-0016)
- {claims 6 and 12} wherein the gear ratio between the drive motor and the ring gear is proportional to a friction force between the planet carrier and the speed calibration member (abstract; paragraph 0010-0011, 0015-0016)
- {claim 7} a gearing mechanism having a first gear ratio resulting in a high carriage speed and a second gear ratio resulting in a low carriage speed, wherein the gearing mechanism comprises a planetary gear assembly having a sun gear driven by the drive motor; a ring gear; and a plurality of planet gears arranged between the sun gear and the ring gear, wherein, at the second gear ratio, the sun gear rotates and the ring gear is configured to rotate at a slower angular velocity than the sun gear; and a centrifugal clutch operable to switch between the first and second gear ratios wherein the centrifugal clutch is an automatic two-way clutch, such that switching between the first and second gear ratios occurs

automatically based upon an operational speed of the drive motor  
(abstract; paragraph 0010-0011, 0015-0016)

- {claim 13} wherein the speed calibration member is manually adjustable  
(abstract; paragraph 0010-0011, 0015-0016)
- {claim 14} activating a gearing mechanism wherein the gearing mechanism has a first gear ratio resulting in a high carriage speed and a second gear ratio resulting in a low carriage speed and comprising a planetary gear assembly having: a sun gear driven by the drive motor; a ring gear; and a plurality of planet gears arranged between the sun gear and the ring gear; wherein, at the second gear ratio, the sun gear rotates and the ring gear is configured to rotate at a slower angular velocity than the sun gear; and switching between the first and second gear ratio; wherein switching between the first and second gear ratio occurs automatically based on an operational speed of the drive motor (abstract; paragraph 0010-0011, 0015-0016)
- {claim 15} wherein operation of the drive motor at a high speed causes the planet gears and the drive gear to lock together such that they rotate as one with the sun gear resulting in a 1:1 gear ratio between the sun gear and the ring gear (abstract; paragraph 0010-0011, 0015-0016)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teachings of Kushino et al into the invention of Ito et al. The motivation for the skilled artisan in doing so is to gain the benefit of providing



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more reliable speed drive motor control and therefore more accurate printing via the dual speed gear/clutch arrangement. Also, the dual speed gear/clutch arrangement provides a mechanism that is easier on the electrical motor and therefore provides increased reliability of the motor. Even though Kushino et al does not disclose its gearing system in the context of driving a printer carriage, it does disclose a planetary gear system with a two way centrifugal clutch. It is known in the art to incorporate two way clutch systems into a printer driver system. As an illustrative example, Black et al discloses driving a printing system using a two way universal clutch (column 11, lines 11-24). Therefore the more advanced gear/clutch arrangement of Kushino would have been obvious for its defined advantages of increased motor control.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1, 4-7, and 10-15 have been considered but are moot in view of the new ground(s) of rejection. However, the applicant's amendments to the claims appear to be nothing more than a recitation of natural features known to be associated with planetary gearing systems enabled by centrifugal clutches. For example, it is known that when the sun gear engages planetary gears, which engage a ring gear in a low speed mode, the ring gear will naturally rotate at a slower angular velocity than the sun gear. Furthermore, it is known that as the sun gear increases in velocity, the clutch members will expand, connecting the sun gear to the ring gear in a one-to-one ratio. The examiner request that the applicant more clearly define those features which are considered novel.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Dodge (US Pat 1935589) discloses a transmission.

Aikawa et al (US Pat 6770005) discloses a power transmission system and operation method therefor.

Ogura (US Pat 4674612) discloses auxiliary equipment transmission.

Avramidis et al (US Pat 3884097) discloses a two stage transmission.

Jang (US Pat 4827799) discloses a variable planetary transmission for a motorcycle or remote-control car.

Grattan (US Pat 2891421) discloses an automatic transmission for automatic vehicles.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEONARD S. LIANG whose telephone number is (571)272-2148. The examiner can normally be reached on 8:30-5 Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

02/02/09

LSL

/Stephen D Meier/

Supervisory Patent Examiner, Art Unit 2853

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